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| EXAMINER | |
|---|---|
| LEUNG, JENNIFER A | |

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| 1764 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/683,658 | D'EVELYN ET AL. | |
| | Examiner | Art Unit | |
| | Jennifer A. Leung | 1764 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-103* is/are pending in the application.

4a) Of the above claim(s) *94-103* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-103* are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/22/03; 2/12/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.



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## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group I, claims 1-93, in the reply filed on March 7, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 94-103 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### *Specification*

2. The disclosure is objected to because of the following informality:

Section [0028] should be updated to identify U.S. Patent Application No. 09/683,659, filed on January 31, 2002, as the related application. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-93 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear as to the structural limitation applicant is attempting to recited by, "said capsule being self-pressurizing" (line 4), since the pressurization is caused by the supercritical fluid, and the supercritical fluid is not considered an element of the apparatus.

Regarding claims 24 and 72, "said at least one compression ring" lacks proper positive

antecedent basis.

Regarding claims 27, 28, 33, 34, 75, 76, 81 and 82, it is unclear as to the structural limitation applicant is attempting to recite by, "a pressure response of ___", since the pressure response is not considered an element of an apparatus but a process limitation. As defined in the specification, section [0032], the "pressure response" is "the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition." Such are variables of an intended process.

Regarding claims 39-41, 47-49 and 91-93, it is unclear as to the structural limitation applicant is attempting to recite by "said capsule is self-pressurizable" since the pressurization is caused by the supercritical fluid, which is not considered an element of the apparatus, and the specific ranges of pressures are considered process limitations.

Regarding claim 42, it is unclear as to the structural limitation applicant is attempting to recited by, "said capsule is self-pressurizing" (lines 4-5), since the pressurization is caused by the supercritical fluid, and the supercritical fluid is not considered an element of the apparatus.

Regarding claim 50, it is unclear as to the structural limitation applicant is attempting to recited by, "said capsule is self-pressurizing" (lines 6-7), since the pressurization is caused by the supercritical fluid, and the supercritical fluid is not considered an element of the apparatus.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 42 and 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobs (US 1,879,278).

Regarding claim 42, Jacobs (FIG. 3; page 1, lines 67-97) discloses a capsule having at least one wall (i.e., as defined by shell **10**, made of metal; page 1, lines 9-10), a closed end (i.e., facing the rim portion **20**), and a sealed end (facing the bullet portion **11**) defining a chamber (i.e., containing powder **14**) therein.

Regarding claims 47-49, the capsule of Jacobs structurally meets the claims, since the "self-pressurizable" feature is not considered part of the apparatus (e.g., the pressurization is caused by the supercritical fluid, which is not an element of the apparatus).

Instant claims 42 and 47-49 structurally read on the apparatus of Jacobs.

5. Claims 42-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Suthanthiran (US 4,891,165).

Regarding claim 42, Suthanthiran (FIG. 1, 1A and 1B; column 3, lines 9-56) discloses a capsule **10** having at least one wall (i.e., wall **16** of sleeve **12**), a closed end (i.e., as defined by the bottom portion **13** of sleeve **11**, when interfitted with sleeve **12**), and a sealed end (i.e., as defined by the bottom portion of sleeve **12**, when interfitted with sleeve **11**) defining a chamber (i.e., cavity **15**) therein.

Regarding claims 43 and 44, Suthanthiran discloses the capsule **10** is formed of a first material comprising a metal such as stainless steel, copper, gold and platinum (column 2, line 62 to column 3, line 8); therefore, the capsule **10** is inherently formed of a malleable metal having a low hydrogen permeability.

Regarding claim 45, Suthanthiran discloses the capsule **10** includes an inert liner inserted

into said chamber **15** (i.e., as defined by wall **16** of sleeve **11**, when interfiled with sleeve **12**), wherein said inert liner **16/11** is formed from a second material comprising a metal such as stainless steel, copper, gold and platinum (column 2, line 62 to column 3, line 8), wherein said inert liner **16/11** is between about 1 micron and about 5 mm thick (i.e., "... the thickness of the wall portions can range from about 0.03 mm to about 2.0 mm," column 3, lines 26-41), and wherein the second material is different from the first material (i.e., "It should be appreciated that the materials of each sleeve do not have to be the same. Sleeves of different materials can be interfitted to provide a tightly sealed capsule," column 4, lines 57-60).

Regarding claim 46, Suthanthiran (FIG. 1, 1A, 1B) discloses said at least one wall **16/12** said closed end **13/11**, and said sealed end **13/12** each have a thickness of between about 0.5 mm and about 25 mm (i.e., "The thickness of the bottom portions can range from about 0.05 mm to about 3.0 mm, while the thickness of the wall portions can range from about 0.03 mm to about 2.0 mm," column 3, lines 26-41).

Regarding claims 47-49, the capsule of Suthanthiran structurally meets the claims, since the "self-pressurizable" feature is not considered part of the apparatus (e.g., the pressurization is caused by the supercritical fluid, which is not an element of the apparatus).

Instant claims 42-49 structurally read on the apparatus of Suthanthiran.

6. Claims 1, 5, 8-11, 13, 16-18, 20-22, 26-29, 33, 34, 39-42 and 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson et al. (US 3,473,935).

Regarding claims 1 and 42, Wilson et al. (FIG. 1, 2) discloses a high temperature and high pressure apparatus comprising:

a) a capsule (i.e., closed and sealed capsule **31**, defining a chamber containing material **29**;

column 2, line 61 to column 3, line 7);

b) a pressure transmission medium (i.e., pyrophyllite plugs **34**, **35**, **36**; talc cylinder **32**; column 3, lines 23-45) surrounding said capsule **31**;

c) a heating system comprising at least one heating element (i.e., carbon cylinder **33**) inserted in said pressure transmission medium **32**, **34**, **35**, **36** such that said heating element **33** is proximate to said capsule **31**, and a wattage control system electrically coupled to said heating element **33** to provide power to said heating element (i.e., conductors **39** and **40**, comprising means for controlling the passage of an electric current to heating element **33** and then abruptly cutting off the electric current; column 3, lines 45-54);

d) a restraint (i.e., press pistons **23**, **24** with end elements **26**, **27**, biased toward one another by a hydraulic press, not shown, in cooperation with core **16**) to contain and hold in place said capsule **31**, said pressure transmission medium **32**, **34**, **35**, **36**, and said at least one heating element **33**, wherein said restraint **23**, **24** maintains said capsule **31**, said pressure transmission medium **32**, **34**, **35**, **36**, and said at least one heating element **33** at a constant pressure (column 3, lines 7-22); and

e) at least one seal (i.e., electrically conducting end caps **37**, **38**; column 3, lines 33-40) being disposed between restraint **23**, **24** and pressure transmission medium **32**, **34**, **35**, **36**.

Regarding claim 5, the heating element (i.e., carbon cylinder **33**; column 3, lines 45-55) is an electrically resistant heating element in the form of a tube.

Regarding claims 8-10, Wilson et al. (FIG. 1; column 3, lines 23-44) discloses a clamp (i.e., core **16**) and at least one gasket (i.e., electrically insulating pyrophyllite members **43**, **44**)

disposed between clamp **16** and a portion of the restraint (i.e., end element portions **26**, **27**).

Regarding claim 11, Wilson et al. (FIG. 1; column 3, lines 23-44) discloses gaskets **43**, **44** include an electrically conductive element (i.e., the end elements **26** and **27**) within the electrically insulating gaskets **43**, **44**, wherein the element **26**, **27** are formed of tungsten carbide.

Regarding claim 13, Wilson et al. (FIG. 2; column 3, lines 32-40) discloses the at least one seal comprises a top seal (i.e., electrically conductive end cap **37**) and a bottom seal (i.e., electrically conductive end cap **38**).

Regarding claims 16-18, Wilson et al. discloses the pressure transmission medium comprises a pyrophyllite plug **34**, **35**, **36** and a talc cylinder **32** (column 3, lines 23-44); therefore, the pressure transmission medium is inherently thermally stable up to about 1000 °C with an internal friction of less than about 0.2 and the pressure transmission medium is inherently a solid up to about 1300 °C (i.e., materials such as pyrophyllite and talc are defined by Applicant's specification, section [0020], to exhibit such properties).

Regarding claims 20-22, Wilson et al. (column 3, lines 7-22) discloses the restraint comprises at least one die (i.e., core **16**), at least one punch (i.e., end elements **26**, **27**), and a press (i.e., press pistons **23**, **24** with a hydraulic press, not shown), wherein the die **16** is formed of tungsten carbide and comprises a straight-walled die (see FIG. 1).

Regarding claim 26, as seen in FIG. 1, the at least one punch **26**, **27** is a flat-bottomed punch, squeezed against die **16** by said press **23**, **24**.

Regarding claims 27 and 28, as defined in the specification, section [0032], the "pressure response" is defined as "the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition."

Such are variables of an intended process. Therefore, the apparatus of Wilson et al. structurally meets the claims since the "pressure response" is not considered an element of the apparatus but a process limitation.

Regarding claim 29, Wilson et al. discloses a restraint comprising a multi-anvil press (i.e., multiple press pistons **23** and **24** with end elements **26** and **27**, respectively; FIG. 1).

Regarding claims 33 and 34, as defined in the specification, section [0032], the "pressure response" is "the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition." Such are variables of an intended process. The apparatus of Wilson et al. structurally meets the claims since "pressure response" is not considered an element of the apparatus but a process limitation.

Regarding claims 39-41 and 47-49 the capsule of Wilson et al. structurally meets the claims, since the "self-pressurizable" feature is not considered part of the apparatus (e.g., the pressurization is caused by the supercritical fluid, which is not an element of the apparatus), and the specific pressures are considered process limitations. In any event, Wilson et al. further discloses that it is possible to obtain pressures up to 60,000 atmospheres in the capsule (column 3, lines 43-44).

Instant claims 1, 5, 8-11, 13, 16-18, 20-22, 26-29, 33, 34, 39-42 and 47-49 structurally read on the apparatus of Wilson et al.

7. Claims 1-3, 5, 6, 8, 9, 13-15, 20, 21, 24, 26-28, 39-42 and 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Vahldiek et al. (US 3,313,004).

Regarding claims 1 and 42, Vahldiek et al. (FIG. 1, 2; column 1, line 53 to column 3, line 40) discloses a high temperature and high pressure apparatus comprising:

a) a capsule (i.e., a specimen or sample receiving compartment or cell **1**, defined by a boron nitride cylinder wall **10** sealed and closed with a pair of lava plugs **11**, **12**);

b) a pressure transmission medium (i.e., a second boron nitride cylinder **16**) surrounding said capsule **1/10/11/12**;

c) a heating system for heating said capsule **1/10/11/12**, said heating system comprising at least one heating element (i.e., a graphite cylinder **13**) inserted in said pressure transmission medium **16** and proximate to said capsule **1/10/11/12,** and a wattage control system electrically coupled to said heating element to provide power to said heating element (i.e., although not illustrated, the apparatus inherently comprises a wattage control system, as evidenced by, "The temperature of the specimen within the compartment **1** is reached by means of electrical energy that is supplied to the pair of leads **26** and **27** in a manner similar to the ways that are disclosed in the Bundy and the Wentorf, Jr. patents cited above, and with the graphite cylinder **13** and the graphite disks **14** and **15** serving as heating agent," column 2, lines 45-51);

d) a restraint (i.e., a punch-die assembly of the belt type, comprising tapered punches **28**, **29**) to contain and hold in place said capsule **1/10/11/12**, said pressure transmission medium **16**, and said at least one heating element **13**, under high pressure; and

e) at least one seal (i.e., steel disks **17**, **18**) disposed between said restraint (i.e., portions **28** and **29**) and said pressure transmission medium **16**.

Regarding claims 2 and 3, Vahldiek et al. discloses said heating system comprising at least one temperature sensor (i.e., thermocouples leads **21**, **22**; column 2, lines 16-28; FIG. 1) disposed proximate said capsule **1/10/11/12**).

Regarding claims 5 and 6, said at least one heating element is an electrically resistant

heating element comprising a tube of graphite (i.e., a graphite resistance heater in the form of a cylinder **13**; column 2, lines 45-51; column 2, line 68 to column 3, line 3).

Regarding claims 8 and 9, Vahldiek et al. (FIG. 1) discloses a clamp (i.e., die **30**) for loading at least one portion of said restraint (i.e., the tapered punches **28** and **29**), and at least one gasket (i.e., frusto-conical lava funnel walls **6** and **24**) disposed between said clamp **30** and at least one portion of said restraint **28**, **29**.

Regarding claims 13 and 14, Vahldiek et al. (FIG. 1; column 2, lines 9-15) discloses the at least one seal comprises a top seal and a bottom seal (i.e., top seal **18** and bottom seal **17**), wherein both seals define end caps formed of steel (i.e., steel disks).

Regarding claim 15, Vahldiek et al. (FIG. 1; column 2, lines 9-35) discloses said top end cap **18** further includes a deformable ring (i.e., the upper portion of lava cylinder **20**) to provide a seal between said clamp **30** and said restraint (i.e., punch **28**).

Regarding claims 20, 21 and 26, Vahldiek et al. discloses said restraint comprises a die **30** and at least one punch **28**, **29**, wherein the die is an angle walled die (FIG. 2). Vahldiek et al. further illustrates a flat-bottomed punch **28**, **29** (FIG. 2), wherein the flat bottomed punch is squeezed against die **30** by a pressing means not illustrated.

Regarding claim 24, Vahldiek et al. (FIG. 2; column 2, lines 36-44) discloses a cooling sleeve (i.e., a cooling channel, between rings **31**, **34**) disposed between die **30** and at least one compression ring (i.e., rings **34**, **36**, **37**) for circulating a cooling medium (i.e., via fittings **38**).

Regarding claims 27 and 28, as defined in the specification, section [0032], the "pressure response" is defined as "the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition."

Such are variables of an intended process. Therefore, the apparatus of Vahldiek et al. structurally meets the claims since the "pressure response" is not considered an element of the apparatus but a process limitation.

Regarding claims 39-41 and 47-49 the capsule of Vahldiek et al. structurally meets the claims, since the "self-pressurizable" feature is not considered part of the apparatus (e.g., the pressurization is caused by the supercritical fluid, which is not an element of the apparatus), and the specific pressures are considered process limitations. In any event, Vahldiek et al. further discloses that pressures up to 50 kbars can be maintained in the capsule (column 2, lines 55-60).

Instant claims 1-3, 5, 6, 8, 9, 13-15, 20, 21, 24, 26-28, 39-42 and 47-49 structurally read on the apparatus of Vahldiek et al.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 4, 7, 10, 12, 22, 23, 25, 45, 46, 50-58, 60-63, 68-76 and 89-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Hall et al. (US 2,947,610).

Regarding claims 4, 50, 53 and 54, the same comments with respect to Vahldiek et al. apply (see claims 1-3 and 42 above). Vahldiek et al. discloses both a wattage control system (see column 2, lines 45-51) and at least one temperature sensor (i.e., thermocouples leads **21**, **22**; column 2, lines 16-28; FIG. 1), but is silent as to the wattage control system being connected to the temperature sensors to provide a "closed loop temperature control" in response to the signal generated by the sensors **21**, **22**. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure a closed loop temperature control scheme for the wattage control system and temperature sensors in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because it is well known in the art to connect a wattage control system with temperature sensors to enable precise, closed loop control of the reaction temperature, as evidenced by Hall et al. (see column 7, lines 18-63), and the provision of automated means to replace manual activity was held to have been obvious. *In re Venner* 120 USPQ 192 (CCPA 1958); *In re Rundell* 9 USPQ 220 (CCPA 1931). In particular, Hall et al. teaches an apparatus, similar to the apparatus of Vahldiek et al., wherein the temperature in a reaction vessel **32** is determined by fairly conventional means of placing a thermocouple in the reaction vessel and measuring the temperature in the usual manner. Electrical energy at a predetermined rate is then supplied to the apparatus, and the temperature produced by this power is measured by the thermocouple. The same procedure is repeated with different power inputs to produce a calibration curve of power input versus the temperature in the reaction vessel. The

temperature within reaction vessel **32** is thus controlled according to the power input to the apparatus in conjunction with the calibration curve.

Regarding claims 7 and 55, although Vahldiek et al. is silent as to heating a first portion of said capsule to a first temperature and a second portion of said capsule to a second temperature, it would have been obvious for one of ordinary skill in the art at the time the invention was made to vary the temperature across the different portions of the capsule in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because it is known to vary the range of temperature between spaced points within a reaction vessel, as evidenced by Hall et al. (see column 7, lines 64-69), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 10, 12, 58 and 60 Vahldiek et al. is silent as to the at least one gasket (i.e., frusto-conical lava funnel walls **6** and **24**) comprising a gasket made of one of the instantly claimed electrically insulating materials, or at least one electrically conductive gasket of the instantly claimed electrically conductive materials. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was substitute a gasket of the instantly claimed materials for the gasket **6**, **24** in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Hall et al. teaches a known, functionally equivalent gasket assembly **37** comprising a gasket **39** made from an electrically insulating material such as pyrophyllite, as well as a second

gasket **38** made of an electrically conductive material such as steel (column 5, lines 3-24).

Regarding claims 11 and 59, each of punches **28** and **29** are electrically conductive (i.e., with electricity being supplied by leads **26** and **27**), and when mated with the die **30**, the electrically insulating gaskets **6** and **24** will inherently include an electrically conductive element, as defined by the ends of punches **28** and **29**, within the gaskets. Although Vahldiek et al. is silent as to whether the electrically conductive material comprises one of the instantly claimed materials, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select at least one of the instantly claimed materials for the electrically conductive material in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because such materials are well known in the art for their electrically conductive properties, as evidenced by Hall et al. (i.e., punch **22** being formed of Carboloy grade 44A cemented carbide comprising 94 percent tungsten carbide; column 3, lines 37-69).

Regarding claims 22, 23, 25, 70, 71 and 73, Vahldiek et al. discloses the die **30** being contained within at least one compression ring (i.e., rings **31**, **34**, **36**, **37**, with rings **36**, **37** essentially forming a ribbon). Vahldiek et al., however, is silent as to the die **30** or the rings **31**, **34**, **36** and **37** being formed of steel. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to form the rings **31**, **34**, **36**, **37** in the apparatus of Vahldiek et al. from steel, on the basis of suitability for the intended use, because the selection of such material for its ability to withstand high force and high pressure applications is well known in the art, as shown by Hall et al. In particular, the high temperature, high pressure apparatus of Hall comprises a die **27** being contained within at least one compression ring **28**, **29**, wherein die **27** is formed of Carboloy grade 44A cemented carbide and

rings **28**, **29** are formed of AISI 4142 alloy steel (column 4, lines 12-27; FIG. 1, 2).

Regarding claims 45 and 89, the capsule **1/10/11/12** comprises a liner formed from platinum (i.e., platinum plates **2'** and **3'**; FIG. 1; column 1, lines 53-60). Although Vahldiek et al. is silent as to the recited thicknesses for the liner, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a suitable thickness for the liner in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because changes is thickness merely involves ordinary skill in the art, and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 46 and 90, although Vahldiek et al. is silent as to the recited thicknesses for the walls of the capsule **1/10/11/12**, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a suitable thickness for the walls of the capsule in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because changes is thickness merely involves ordinary skill in the art, and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claims 51 and 52, the same comments with respect to Vahldiek et al. apply (see claims 5 and 6 above).

Regarding claims 56 and 57, the same comments with respect to Vahldiek et al. apply (see claims 8 and 9 above).

Regarding claims 61 and 62, the same comments with respect to Vahldiek et al. apply (see claims 13 and 14 above).

Regarding claim 63, the same comments with respect to Vahldiek et al. apply (see claim 15 above).

Regarding claims 68, 69 and 74, the same comments with respect to Vahldiek et al. apply (see claims 20, 21 and 26 above).

Regarding claim 72, the same comments with respect to Vahldiek et al. apply (see claim 24 above).

Regarding claims 75 and 76, the same comments with respect to Vahldiek et al. apply (see claims 27 and 28 above).

Regarding claims 91-93, the same comments with respect to Vahldiek et al. apply (see claims 39-41 above).

9. Claims 16-19 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Strong (US 3,030,662). Claims 64-67 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Hall et al. (US 2,947,610), as applied to claim 50 above, and further in view of Strong (US 3,030,662).

Vahldiek et al. discloses the pressure transmission medium **16** comprises boron nitride, but is silent as to whether the medium may comprise other pressure transmission mediums, such as at least one of the materials as instantly claimed. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select one of the instantly recited materials for the pressure transmission medium in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because the use of such materials as pressure transmission media is well known in the art, as evidenced by Strong, and furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213

USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Strong teaches suitable materials including sodium chloride, sodium fluoride, pyrophyllite, graphite, magnesium oxide (see Tables I-III; column 3, line 43 to column 4, line 48).

10. Claims 29-34 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Bundy (US 3,107,395). Claims 77-82 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Hall et al. (US 2,947,610), as applied to claim 50 above, and further in view of Bundy (US 3,107,395).

Regarding claims 29-32 and 77-80, Vahldiek et al. is silent as to whether the restraint comprising a "punch and die assembly of the belt type" (column 1, lines 14-17; FIG. 2) may instead comprise a multi-anvil press. Bundy teaches a high pressure high temperature apparatus wherein the restraint comprises a multi-anvil press (i.e., punch assembly **25**; FIG. 5) having at least four anvils (i.e., punches **26**, **27**, **29**, **39**, **31** and **32**; column 3, lines 27-60) and at least four pistons (i.e., hydraulic cylinders **37** with hydraulic conduits **38**; FIG. 6, 7; column 3, line 70 to column 4, line 21). The multi-anvil press further comprises a plurality of support plates (i.e., gaskets **40**, **41**) disposed between the anvils and a reaction vessel **50** (FIG. 10; column 5, line 7 to column 6, line 8). It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a multi-anvil press restraint for the restraint in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because a multi-anvil press would enable the high pressure and high temperature apparatus to attain pressures greatly in excess of, for example, 160,000 atmospheres, which is extremely difficult to attain in a punch and die assembly, as taught by Bundy (column 3, lines 3-26).

Regarding claims 33, 34, 81 and 82, as defined in the specification, section [0032], the "pressure response" is defined as "the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition." Such are variables of an intended process. Therefore, the apparatus of Vahldiek et al. structurally meets the claims since the "pressure response" is not considered an element of the apparatus but a process limitation.

11. Claims 35-38 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Bridgman et al. (US 2,544,414). Claims 83-86 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Hall et al. (US 2,947,610), as applied to claim 50 above, and further in view of Bridgman et al. (US 2,544,414).

Vahldiek et al. discloses the tapered punches **28** and **29** of the restraint deliver the force of their thrust against the steel disks **17** and **18** on the opposite sides of the capsule (column 2, lines 29-35). Vahldiek et al., however, is silent as to the restraint comprising the instantly claimed structures for delivering the force against the steel disks. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select the claimed restraint structure for the restraint in the apparatus of Vahldiek et al., on the basis of suitability for the intended use, because such restraint structures are well known in the art, as evidenced by Bridgeman et al., and furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Bridgeman et al. (FIG. 1; column 2, lines 30-48) teaches a conventionally known hydraulic press comprising at least two end flanges (i.e., projections **22**, **23**), a structural

support in the form of an "I-beam" (i.e., base **20**; iron cap **24**) for reinforcing each of the flanges **22**, **23**, and at least one fastener comprising at least one of a bolt and a threaded rod (i.e., threaded vertical shafts **22**, mating with nuts **26**, **25**).

12. Claims 43 and 44 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Wilson et al. (US 3,473,935). Claims 87 and 88 are rejected 35 U.S.C. 103(a) as being unpatentable over Vahldiek et al. (US 3,313,004) in view of Hall et al. (US 2,947,610), as applied to claim 50 above, and further in view of Wilson et al. (US 3,473,935).

Vahldiek et al. is silent as to whether the capsule may be formed from a malleable metal having a low hydrogen permeability, such as one to the instantly claimed metals. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a capsule formed of a malleable metal for the capsule of Vahldiek, on the basis of suitability for the intended use, because the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Wilson et al., for example, teaches that it is known in the prior art to use a capsule formed from platinum (column 2, line 62 to column 3, line 7). Note that although Wilson et al. teaches the platinum capsule as a nonpreferred embodiment, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Jennifer A. Leung
March 30, 2005

Hien Tran

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PRIMARY EXAMINER